

What is claimed is:

1. A collision avoidance control system for a vehicle comprising:  
a collision avoidance deceleration determining circuit  
5 working to determine a target collision avoidance deceleration  
required for a system vehicle equipped with this system to bring a  
relative speed between the system vehicle and a target object present  
ahead of the system vehicle into agreement with substantially zero  
without a physical collision with the target object; and  
10 a control circuit working to determine a possibility of collision  
with the target object as a function of the target collision avoidance  
deceleration, when the possibility of collision is higher than a given  
threshold level, said control circuit performing a predetermined  
collision avoidance operation.  
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2. A collision avoidance control system as set forth in claim 1,  
wherein said collision avoidance deceleration determining circuit  
determines the target collision avoidance deceleration  $G$  according to  
an equation below

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$$G = Vr^2 / \{ 2 \times (D - D_{fin}) \} - Ka \times Af$$

where  $Vr$  is the relative speed between the system vehicle and the  
target object,  $D$  is a distance to the target object,  $D_{fin}$  is a minimum  
25 distance to the target object that is to be reserved when the relative  
speed  $Vr$  becomes zero (0),  $Af$  is acceleration of the target object, and

$Ka$  is a gain ( $0 \leq Ka \leq 1$ ).

3. A collision avoidance control system as set forth in claim 2,  
wherein said collision avoidance deceleration determining circuit  
5 decreases at least one of the minimum distance  $D_{fin}$  and the gain  $Ka$   
as the distance  $D$  increases.

4. A collision avoidance control system as set forth in claim 2,  
wherein said collision avoidance deceleration determining circuit  
10 decreases at least one of the minimum distance  $D_{fin}$  and the gain  $Ka$   
as one of a speed of the system vehicle and the relative speed  $Vr$   
decreases.

5. A collision avoidance control system as set forth in claim 1,  
15 wherein when the target collision avoidance deceleration exceeds a  
preselected alarm activating threshold value, said control circuit  
activates an alarm to output an alarm signal, when the target  
collision avoidance deceleration decreases below a preselected alarm  
deactivating threshold value, said control circuit deactivating the  
20 alarm to stop the alarm signal.

6. A collision avoidance control system as set forth in claim 1,  
further comprising a travel control apparatus working to determine  
a target acceleration as functions of a distance to the target object  
25 and the relative speed and to decelerate or accelerate the system  
vehicle based on the target acceleration to control a travel condition

of the system vehicle, and wherein the alarm activating threshold value is identical with a maximum deceleration controllable by the travel control apparatus.

5     7.     A collision avoidance control system as set forth in claim 1, wherein when the target collision avoidance deceleration exceeds a preselected deceleration control activating threshold value, said control circuit performs deceleration control to decelerate the system vehicle, when the target collision avoidance deceleration  
10 decreases below a preselected deceleration control deactivating threshold value, said control circuit deactivating the deceleration control.

8.     A collision avoidance control system as set forth in claim 7,  
15 further comprising a travel control apparatus working to determine a target acceleration as functions of a distance to the target object and the relative speed and to decelerate or accelerate the system vehicle based on the target acceleration to control a travel condition of the system vehicle, and wherein the deceleration control  
20 activating threshold value is set greater than a maximum deceleration controllable by the travel control apparatus.